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Hydrographic Surveying of Antarctic Waters

IHO Seminar

Hydrographic Surveying of Antarctic Waters

Working Paper submitted by Norway, Italy, New Zealand, and the United States

IHO Seminar

Summary

This Working Paper acknowledges that there is a lack of data supporting our understanding of the shape of the seafloor within the Antarctic region. Efforts have, however, been developed to obtain, collect, and make discoverable bathymetric data at a global scale (IHO DCDB, IHO Crowdsourc WG and GEBCO Seabed 2030), but more needs to be done to cover the Antarctic region. The paper encourages ATCM Parties to engage their national programmes, institutions and agencies to support this effort by actively making existing data available and collecting data where appropriate within the Antarctic region. The WP asks the Meeting to agree on a best way forward to ensure that research vessels, and all vessels operating in the Antarctic region record depth data and make the data available for scientific and public use, increasing ocean knowledge, securing sustainable development of our oceans. To support this Parties are invited to;

- 1) Endorse the updated Resolution on Hydrographic Mapping in Antarctic waters;
- 2) Support and encourage, hydrographic and bathymetric data owners to review existing data holdings for submission to the IHO DCDB where possible;
- 3) Support and encourage vessel operators and managers to collect new hydrographic and bathymetric data for submission to the IHO DCDB where possible.

Background

Hydrographic and bathymetric surveying and charting is integral to safety of navigation worldwide, securing international transport, protecting the environment and supporting the global economy. Hydrographic surveying is also vital to increase our knowledge of the ocean. The base layer of ocean knowledge is the knowledge about the depth and shape of the seafloor. The first global initiative to map the ocean floor is the current running GEBCO (General Bathymetric Chart of the Oceans)-project that started in 1903, collecting passage soundings from ships of opportunity. Despite efforts over the past 116 years, and all modern technology available today, we still have very limited knowledge about the seabed of our oceans, seas and waterways. This is especially true for our Arctic and Antarctic waters, where less than 10 percent of the seafloor is mapped.

Mapping all the oceans seafloor is complex, costly, time consuming and by any standard, a major undertaking. In 2017, a new global initiative, the GEBCO Seabed 2030, aims to do just that; to map the ocean floor to a much more detailed level of knowledge by the year 2030. The ambition of the GEBCO project is so vast, that it will never meet its aim if we are to continue present day mapping routines. The hydrographic offices of the world have limited resources to map the seafloor and logically, these resources are primarily targeted at national coastal waters for the purpose of safety of navigation and sustainable development of the coastal zone. We therefore need to look at other ways, and at other actors that can contribute to improving our base layer of ocean knowledge, hydrography. Supporting the GEBCO project, the IHO constituted a Crowdsourc Bathymetry Work Group (CSBWG) that is working with the IHO Data Center for Digital Bathymetry (IHO DCDB) to develop the infrastructure to organize processes, governance, archiving and discoverability of this data. Every vessel with depth measuring equipment (echo sounder) and

means to record data can contribute. Not all vessels have the type of equipment that can measure the deep ocean floor and not all vessels sail outside the well-charted sea routes. This makes research vessels, fishing vessels, commercial survey vessels and expeditionary cruise ships especially suited to contribute to the global sea mapping initiatives, also known as Crowdsourced Bathymetry initiatives.

On a national level, the Norwegian Mapping Authority Hydrographic Service and the Institute for Marine Research have signed a Memorandum of Understanding for this specific purpose, providing guidance on how to survey in order to secure maximum value of the data. This is one example on how parties might facilitate further mapping efforts through systematic cooperation between mapping authorities and research institutions, also in Antarctic waters. During the 2019 cruise to Antarctica, utilizing its new research vessel KP Haakon, Norway undertook mapping of the ocean floor as part of its itinerary.

These new initiatives and projects are underway, but more needs to be done on a larger scale to reach the goal of mapping the ocean floor to a higher resolution to support the expanding users of this data. Parties need to agree on a best way forward to ensure that bathymetric (depth) data is recorded whenever possible, and that data is made available for scientific and public use. GEBCO Seabed 2030, CSBWG and IHO DCDB data processes and workflows are created to minimize the effort by data owners and vessel operators. The guidance for coordinating crowd-sourced bathymetry data is available in IHO *Publication B-12 – Crowdsourced Bathymetry Guidance Document*. This initiatives will provide for the means of delivery and distribution of data through a public database. The groups are actively working to message the opportunity globally. Robust ATCM support for these initiatives, and positive action to encourage regional participants to understand the importance, and actively contribute where possible will improve the situation within the Antarctic region.

The question of hydrographic mapping of Antarctic waters has been addressed by the ATCM in the past. The first resolution on this topic was adopted at ATCM XXXI in Kiev with res. 5 (2008), which recommended that: that Governments “...clarify requirements for the collection of hydrographic data... identify priority areas... encourage their national programme vessels to collect data... endeavor to find additional resources towards...”.

The issue was also addressed at ATCM XXXVII in Brasilia, Brazil with Resolution 5 (2014) which recommended that “*the Parties... promote contacts between national Antarctic programs and national HOs... increase mutual cooperation... co-ordinate hydrographic surveys... complete their inventory of data holdings... avoid duplication of effort... encourage...all other vessels to... collect data including passage soundings, ...forward data collected to chart producer ...*”. Only minor improvements have been made since then.

Noting that surveying efforts in Antarctica still lag behind due to lack of prioritization and the remote nature of the region, we see a need for renewed and strengthened focus on the full implementation of the existing resolutions. We must ensure research vessels, and other relevant vessels, are enabled to contribute to the current efforts of hydrographic mapping of Antarctic waters. This renewal should include strong statement of support for IHO DCDB, the GEBCO Project and use of the infrastructure being developed by the CSBWG.

We need ATCM and IHO to agree on a best way forward to ensure that the research vessels, and all vessels operating in the Antarctic region record depth data and make the data available for scientific and public use, increasing ocean knowledge, securing sustainable development of our oceans. The purpose of this proposed resolution is to take the ambitions expressed by ATCM in previous Resolutions to a new level of concrete action.

Proposal

Taking into account what has been highlighted in this paper, and the work carried out so far, Parties are invited to;

- 4) Endorse the updated Resolution on Hydrographic Mapping in Antarctic waters;

- 5) Support and encourage, hydrographic and bathymetric data owners to review existing data holdings for submission to the IHO DCDB where possible;
- 6) Support and encourage vessel operators and managers to collect new hydrographic and bathymetric data for submission to the IHO DCDB where possible.

Recommendation

Norway, Italy, New Zealand, and USA recommend that the ATCM adopt the attached resolution on Hydrographic Mapping of Antarctic Waters.

Resolution XXX (2019)

Hydrographic Mapping of Antarctic Waters

The Representatives

Recalling Recommendation XV-19 (1989) and Resolutions 1 (1995), 3 (2003), 5 (2008), 2 (2010), and 5 (2014) which contain general provisions regarding cooperation on hydrographic surveying and charting of Antarctic waters, noting their continued validity;

Considering that reliable hydrographic data and nautical charts are essential for safe maritime operations and the protection of the marine environment;

Noting that the collection of accurate bathymetric data will improve navigational safety and support scientific research;

Concerned about the lack of progress on hydrographic mapping and bathymetric data collection of Antarctic waters and the risk of harm that may befall ships, people and the environment within inadequately chartered waters in the region;

Acknowledge the efforts of the IHO Data Center for Digital Bathymetry, the GEBCO Seabed 2030 project and the IHO Crowdsourced Data Working Group

Recognizing the role of the International Hydrographic Organization Hydrographic Commission on Antarctica (HCA) in the coordination of hydrographic surveying and nautical charting in the Antarctic region, and the value of cooperating with SCAR and other relevant expert bodies;

Recommend Parties to give priority to reviewing existing bathymetric data holdings and collecting new bathymetric data in the Antarctic region by

1. Encouraging their national programme vessels and other vessels including non-governmental vessels, as appropriate, to:
 - a. Review existing bathymetric data holdings for inclusion in the IHO DCDB
 - b. Undertake hydrographic and bathymetric data collection on all their Antarctic voyages, as practicable.
 - c. Utilize IHO guidelines where appropriate, including the IHO *Publication B-12 – Crowdsourced Bathymetry Guidance Document*.
 - d. Share all data collected with the IHO Data Center for Digital Bathymetry, either directly or through their national hydrographic office.
2. Encouraging cooperation between national research institutions and mapping institutions/authorities on hydrographic surveying and charting in the Antarctic region, in order to secure the highest value of collected data for the widest possible (re)use by following basic hydrographic survey guidelines.

Recommend Parties to endeavor to find additional resources put towards improving hydrographic surveying and charting in the Antarctic region;

Encourage those Parties who are also Parties to CCAMLR to consider possible actions within CCAMLR's mandate, to ensure that fishing vessels and research vessels operating in the CCAMLR Convention area undertake hydrographic and bathymetric data collection on all their Antarctic voyages, as practicable.